The Radio Amateur Satellite Corporation

Barry A. Baines WD4ASW
President

AMSAT®

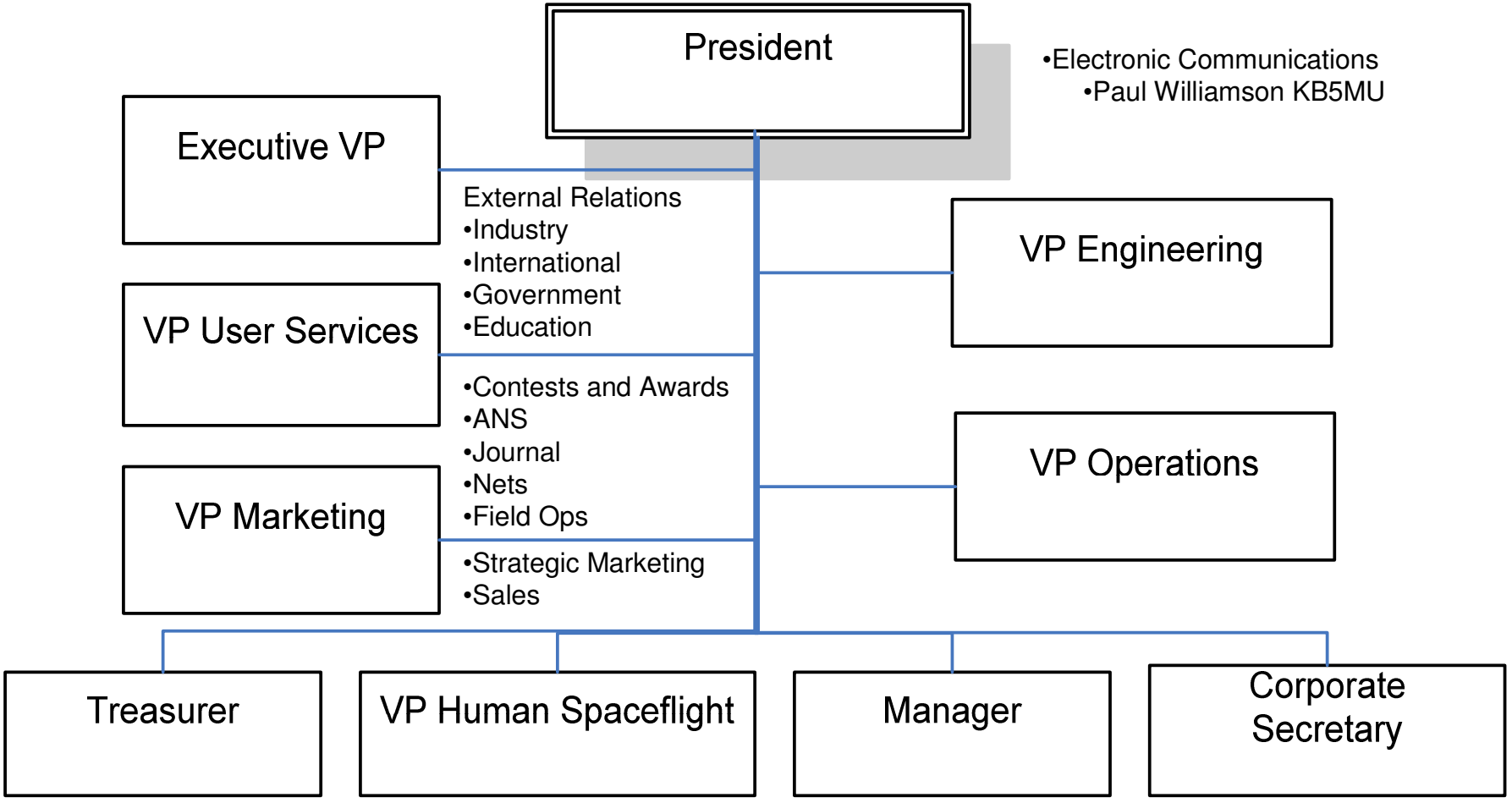
2008 Annual Meeting

Saturday, October 25, 2008

2009 AMSAT Board of Directors

2009	**Barry Baines, WD4ASW**	**Westborough, MA**
2009	**Drew Glasbrenner, KO4MA**	**New Port Richey, FL**
2009	**Rick Hambly, W2GPS**	**Saverna Park, MD**
2009	**Gunther Meisse, W8GSM**	**Mansfield, OH**
2010	**Tom Clark, K3IO**	**Clarksville, MD**
2010	**Lou McFadin, W5DID**	**Orlando, FL**
2010	**Gould Smith, WA4SXM***	**Knoxville, TN**
Alternate:	**Bill Ress, N6GHZ***	

Roles and Expectations for BOD and Officer positions



Senior Leadership Team

President	**Barry Baines, WD4ASW**	**Westborough, MA**
Executive VP	**OPEN**	
VP Operations	**Drew Glasbrenner, KO4MA**	**New Port Richey, FL**
VP User Services	**Gould Smith, WA4SXM**	**Knoxville, TN**
VP Engineering	**OPEN***	
VP Marketing	**OPEN***	
Secretary	**Lee McLamb, KU4OS**	**Cocoa, FL**
Treasurer	**Gunther Meisse W8GSM**	**Mansfield, OH**
Manager	**Martha Saragovitz**	**Silver Spring, MD**

2008 Scorecard

- SuitSat
- ARISS (School Contacts/Richard Garriott's Flight)
- P3-E; International Cooperation
- Eagle and Rideshare Developments
- AO-51 Performance
- AO-7 and AO-16 on the air
- AMSAT Presence at Major Hamfests/Conferences
- AMSAT Lab
- Regulatory Issues, ITAR
- AMSAT Store/Internet Presence
- AIMS
- Volunteer Database-Expanding the Talent Pool

W2GPS' President's report in 2007: The Reality of the Future

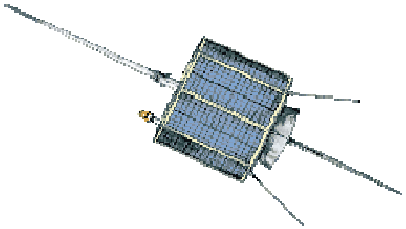
As of 2007

- New missions will provide great new services to the Ham community but we cannot pay for them.
- No one will pay for more "toys" for us to play with.
- Our missions must excite the funding sources.
- **EDUCATION**
  - » AMSAT Institute
  - » Phase-IV TDRS-like support of ARISS
- **EMERGENCY COMMUNICATIONS**
  - » Phase-IV geosynchronous satellite (Rideshare)
  - » Advanced Communications Payload

AMSAT is Amateur Radio

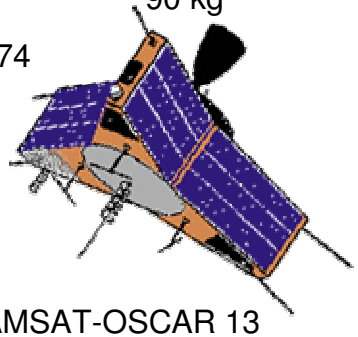
AMSAT is to satellites what the Wright brothers were to flight.

OSCAR 1
Launched 12-Dec-1961
Vandenberg AFB
Agena Rocket
Apogee 431.00 km
Perigee 245.30 km
4.5 kg



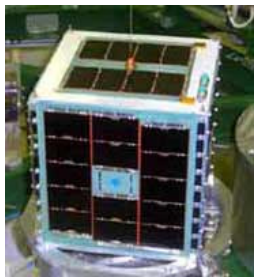
AMSAT-OSCAR 7
Launched 15-Nov-1974
Vandenberg AFB
Delta 2310
Apogee 1459 km
Perigee 1440 km
28 kg

AMSAT-OSCAR 10
Launched
6-Jun-1983
French Guiana
Ariane 4
Apogee 35465 km
Perigee 3982 km
90 kg



AMSAT-OSCAR 13
Launched15-June-1988
French Guiana
Ariane 4
Apogee 36077 km
Perigee 2545 km
92 Kg

AMSAT-OSCAR 40
Launched 16-Nov-2000
French Guiana
Ariane 5
Apogee 58665.00 km
Perigee 1157.00 km
244.000 Kg



AMSAT-OSCAR 51
Launched 28-Jun-2004
Baikonur Cosmodrome
Dnepr rocket
Apogee 818 km
Perigee 696 km
11.14 kg

We are "Amateur" only in the sense that we are not paid in much the same sense that Olympic athletes are "Amateurs."

AO-51
Four Years of Great Performance

AMSAT™
850 Sligo Ave. Suite 600
Silver Spring, MD 20910
1-888-322-6728

AO-51 Schedule

Launch Pad | Navigator | Sat Status | Passes | News | Store | Members | Contact Us | Return

Monthly Schedule

complete operation please see Control Team News (text format)

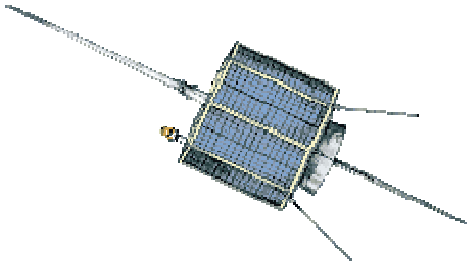
Schedule for May 2008

All dates begin at 0000 UTC, Sundays shown in gold

	Channel A		Beacon	Channel B	
	Uplink	Downlink		Uplink	Downlink
1	145.920 FM	435.300 FM	435.150 FM	1268.700 PBP 9k6	435.150 PBP 9k6
2	145.920 FM	435.300 FM	435.150 FM	1268.700 PBP 9k6	435.150 PBP 9k6
4	145.920 FM	435.300 FM	435.150 FM	1268.700 PBP 9k6	435.150 PBP 9k6
16	145.920 FM	435.300 FM	435.150 FM	1268.700 PBP 9k6	435.150 PBP 9k6
17	145.920 FM	435.300 FM	435.150 FM	1268.700 PBP 9k6	435.150 PBP 9k6
18	145.920 FM	435.300 FM	435.150 FM	1268.700 PBP 9k6	435.150 PBP 9k6
19	145.920 FM	435.300 FM	435.150 FM	1268.700 PBP 9k6	435.150 PBP 9k6

Remarkable performance since its 2004 launch!

AO-7 Is Still Working



- AO-7 was launched Nov 1974 from Vandenberg, AFB aboard a Delta 2310.
- 1459 x 1440 Km orbit inclined 101.59 degrees.
- AO-7 failed in 1981 due to battery failure.
- In 2002 one of the shorted batteries became an open and now the spacecraft is able to run off solar panels.
- During long periods in the sun AO-7 returned to it's schedule of alternating between Mode A and Mode B. This period of non-eclipse will return sometime in late Autumn each year for the foreseeable future and will extend well into the Spring.

AO-16 Recovery

- Launched on 22 January, 1990.
- On-board computer can't access EDAC SRAM needed to run uploaded software.
- Boot loader (MBL) software was burned into ROM prior to launch and continues to run.
- It remains possible to send commands directly to various hardware modules.
- One of these commands allows a receiver to be directly tied to a transmitter.

AO-16 Now Active

- The twist is that the uplink is FM but the downlink via the BPSK transmitter is DSB.
- The satellite hears VERY well. By using USB or LSB the ground station receiver hears well too.
- Tuning the downlink is just like on a linear transponder - it is tight and with fast Doppler.
- Uplink tuning is not required, like FM V/U sats.
- AO-16 open for use on voice since Jan 2008.
- Up 145.920 FM, Down 437.026 SSB ± Doppler.
- Watch Dog Timer Issue

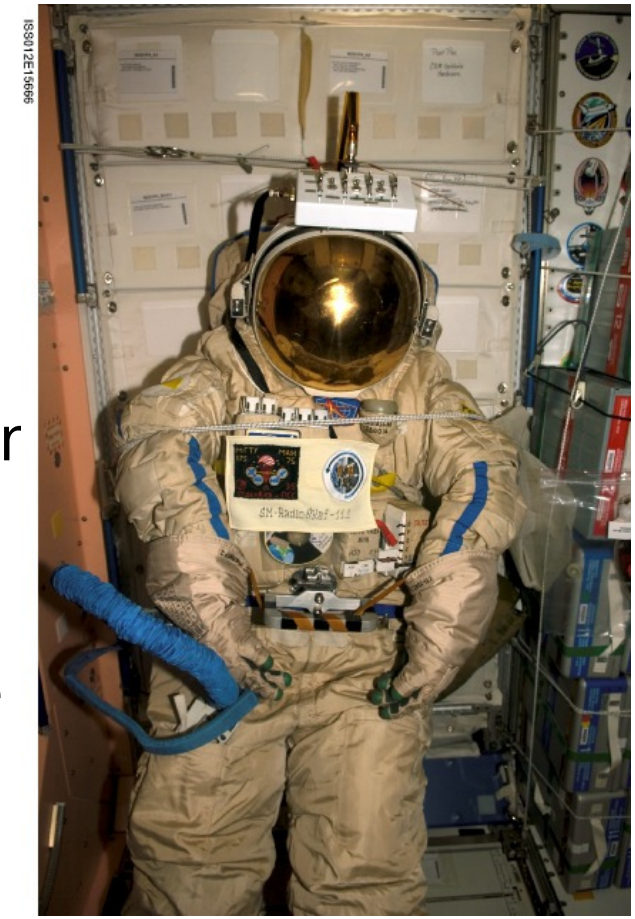
SuitSat-1
A Spacesuit Floats Free

Dubbed Suitsat-1, the Russian spacesuit was fitted with a transmitter and was pushed out by the space station crew to orbit the Earth.

SuitSat captured the attention of the world and helped promote Amateur Radio.

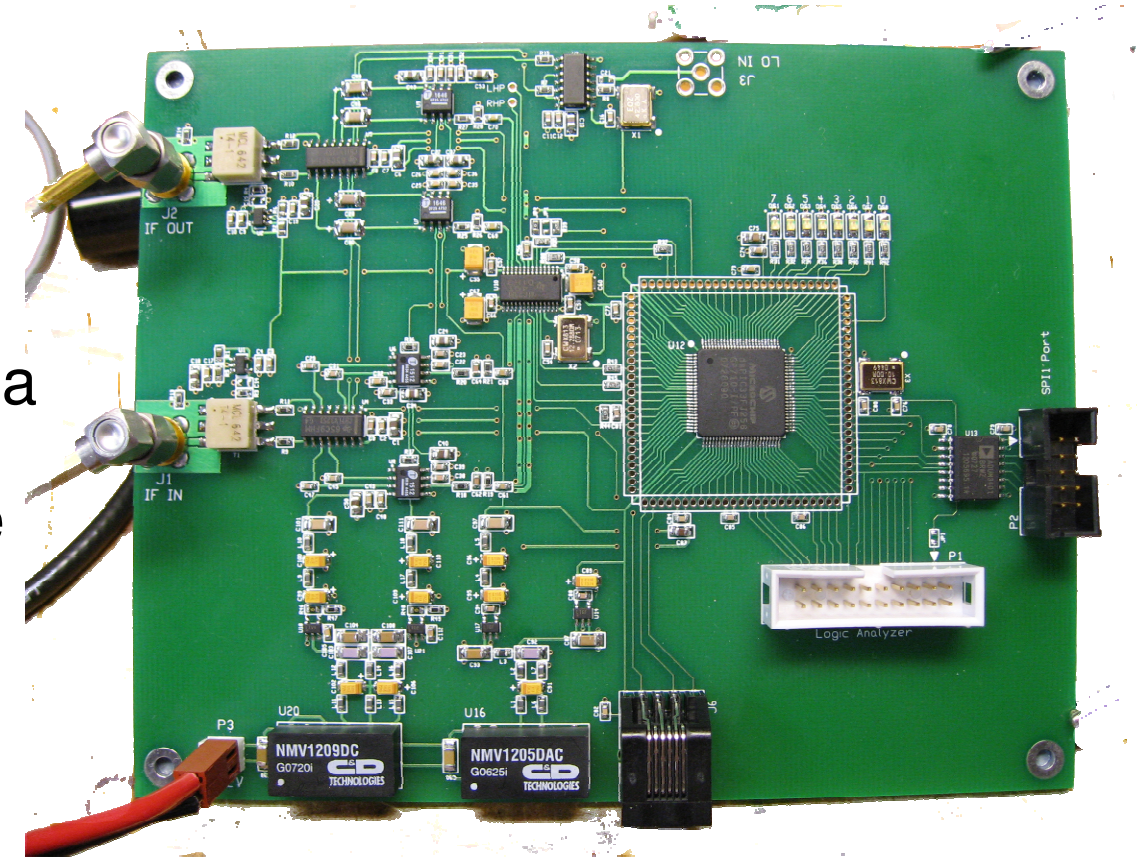
SuitSat-1
Downlink Messages

- Voice telemetry (mission time, temperature, battery voltage)
- Russian message
- Europe student message (Spanish & German)
- Bauman Institute message in Russiar
- Canada student message in French
- Mr. Alexandrov message in English
- Japan student message in Japanese
- USA student message in English
- SSTV picture transmission

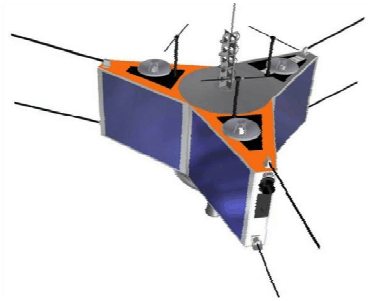


SuitSat-2
ODYSSEY - Low Power Handheld SDR

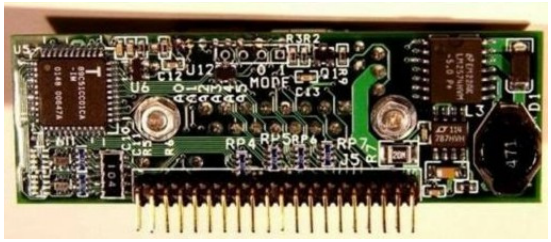
- Enable low power, hand-held software defined radio objects to be built.
- Project Odyssey was born at the Johnson Space Center during a design meeting for experiments we hope to be included on SUITSAT-2.
- May provide a comm package for future CubeSats.



AMSAT P3-E Status



- AMSAT-DL Does Not Have a Launch at a Price it Can Afford
- AMSAT-DL now resides in smaller ZEL
- IHU-3/SDX are ITAR Issues
- Doubtful that the Satellite Will Be Completed by 31 DEC 08
- P3-E is Dependent Upon P5-A
- AMSAT-NA & AMSAT-UK Have Provided Significant $$$ Support



Educational Outreach
University Mentors, Education & Satellites

AMSAT is working with several groups to promote the education and training of the next generation of engineers and scientists through hands-on satellite design and construction projects.

Credit: FASTRAC

AMSAT-NA Considering Establishing AMSAT Summer Camp

Richard Crow N2SPI and his students at the 2007 AMSAT Annual meeting

New AMSAT Lab in Pocomoke City MD
Move-in January 4-5, 2007

New AMSAT Lab
Clean Room being Erected, April 2007

New AMSAT Lab
Taking Shape, Sept 2007

New AMSAT Lab
Taking Shape, 2007 - 2008

AMSAT will have a remote controllable ground station at the lab with a tower and large antennas.

New AMSAT Lab
Taking Shape, March 2008

AMSAT's Next Major Project: Eagle

- Next Generation high earth orbit satellite
  - » Intended orbit: High eccentricity GTO
  - » May become a GEO Rideshare Payload

- Capabilities
  - » U/V and L/S software defined transponders
  - » S2/C Advanced Communications Payload (ACP)
- Robust support for emergency communications
  - » Digital voice, SMS-like text, and data communications

Recent Eagle Developments

The Good News and the Bad News…

First, the 'Bad' news

- The VP-Engineering Resigns in July
- ACP/Ground Station Development is placed on Hold
- AMSAT Lab is Closed/In Process of Securing AMSAT Assets due to changes at HISS

Consequently, the Rebuilding of Engineering has Begun

- Process of Redefining the Engineering Department
- VP-E Position under Evaluation/Task Force Established
- Options for the AMSAT Lab are Evaluated

Recent Eagle Developments

Now, the 'Good' News

- After Almost a Year, We started Active Discussions with Intelsat to discuss a specific Opportunity
- An NDA Has Been Signed
- Initial Drawings have been Received Which Gives AMSAT an Idea of Potential Placement of AMSAT Assets

Consequently, We Developed Initial Options

- K3IO Develops Proposal that will 'Fit' in the Available Space
- Impact of the Planned Placement of the Satellite

Recent Eagle Developments

It is Clear that Placement on Intelsat offers significant Advantages

- Simplified Development (a 'Box' not a Self-contained Satellite)
- 'Continuous Coverage' for Emergency Communications
- A Way to Get into Space
- May be the Most 'Cost-Effective' Option

However, this is NOT an 'Inexpensive' Path to Space and Intelsat will not talk seriously with AMSAT unless we can demonstrate an ability to cover projected costs

Recent Eagle Developments

The Good News… (cont'd)

- At Symposium, K3IO presented a 'Rideshare' Proposal
- Next Steps Include:
  - » Recruiting an Engineering Team/Near Term Satellite Task Force
  - » Refining the Design/Dealing with Technical Issues
  - » Confirming with Intelsat what our Prospects are
  - » Be open to any future launch opportunities

As AMSAT Pursues Rideshare, Fundraising becomes a Critical Concern

- Case for Support
- AMSAT Must Create a Development Team
- AMSAT Must Create CREDIBILITY with the Membership and Outside Stakeholders

Near Term Satellite Task Force

- Team Established to Develop 'Next Steps' Strategy
- Team Members Include:
  - » Bill Ress, N6GHZ
  - » Drew Glasbrenner, KO4MA
  - » Tony Monteiro, AA2TX
  - » Lou McFadin, W5DID
  - » Total Team will be Five Members

Team is tasked with developing recommendations regarding Eagle

- » Use K3IO's proposal as a starting point
- » Develop 'modularization' strategy to adapt to various structures
- » Create interface specs/establish engineering standards
- » Provide engineering budget input for 2009

Near Term Satellite Task Force

- Meanwhile, volunteers may indeed continue engineering development on their own
  - » Small teams focused on particular areas of interest
  - » Attract new volunteers
  - » An 'open' organizational structure with less formal relationships
- The next VP-Engineering may need different skill sets
  - » Project Management-how to tie diverse teams together
  - » Working within multiple teams
  - » Mentoring becomes more critical
  - » Serves as the liaison between teams and AMSAT

Coming to Grips with ITAR

AMSAT must deal with ITAR—it can not be ignored and does have a major impact on international projects

- ITAR is impeding volunteer project support
- Volunteers are concerned about past history
- Ability to deal with ITAR situations in the future is dependent upon clarifying the past
- Clear guidance is needed for our officers and volunteers

Consequently, AMSAT will:

- Seek legal advice/develop ITAR strategy
- Determine feasibility of seeking ITAR exemptions
- Inform our builder community of lessons learned
- Work with individuals to address concerns
- Develop guidelines/training for officers/volunteers for ITAR compliance

Overview

AMSAT's Mission Statement

As of 21-Feb-04

- AMSAT designs, builds and operates experimental satellites and promotes space education.
  - » Focus is on coverage and availability
- Partnerships
  - » NASA, ARISS – Human Space Flight
  - » Education: Foundations, Universities
  - » LEO satellite projects and education outreach
- Technical and scientific innovation
- Training and development
  - » Designers and Operators.

President's report for 2008

AMSAT's Vision Statement

As of 24 OCT 08

- Deploy satellite systems
  - » Wide area
  - » Continuous coverage
- Participation in human space missions
- Support a stream of LEO satellites
  - » Developed in cooperation with the educational community and other amateur satellite groups.

President's report for 2008

AMSAT's Vision Statement

As of 24 OCT 08

- Why Modify the Vision?
  - » Remove Dates-Focus on End Result
  - » Recognize that we will accept a variety of launch opportunities (HEO/Rideshare/MEO)
  - » Cost of Projects (Launches) drives options
- Recognizes the need to recruit/develop the next generation of builders

AMSAT Needs/Opportunities

- AMSAT Webmaster
- AIMS Development
- AMSAT Journal Copy Editor
- Executive Vice President
- VP-Engineering
- VP-Marketing
- Project Management
- Director-Education
- Software Engineers

Help Wanted

AMSAT needs qualified volunteers for a number of positions!

If you want to be a part of the solution in making AMSAT operational and work toward designing, building and finding a launch, WE NEED YOU!

No pay for 5+ hours per week, but a great deal of satisfaction in knowing you are helping make something happen.

We need people with these skills:

- Marketing
- Sales
- Software engineering
- Hardware engineering
- PC based software design
- Web design and maintenance
- Project management
- Documentation
- Hardware testing
- Software testing
- Hardware prototyping
- Specific area Web site information maintenance
- Video recording, digital conversion and editing
- Write technical or instructional material
- Educational activities
- Promoting AMSAT as an Area Coordinator

and any other area you think you think you can make a difference.

We often have people volunteer, but many don't deliver on their promises. So, pick an area that you think needs improvement and explain what you will do to make it better. Then do something to show that you can follow through.

Send your suggestions, actions plans and a description of why you are capable of doing this task to Gould Smith, WA4SXM, wa4sxm@amsat.org

2009 Goals & Expectations

AMSAT Must Re-Establish Momentum

- Complete SUITSAT-2!!
- Further Refinement of K3IO's Comm Package
- Pursue 'Modularization' Approach-OTS availability
- Fund Raising—Satellite Development and Launch
- Develop an ITAR Strategy
- What to do with the AMSAT Lab?
- Encompass Educational Initiative
- Enhance AMSAT's Information Technology
- Recruit a New Generation of Volunteers
- Encourage Mentorship
- Work with other Organizations

AMSAT Needs YOUR Help

To Achieve AMSAT's Goals We Need New Members, Volunteers, and Money

- Join the Field Ops Team
- Encourage your friends to join AMSAT
- Represent AMSAT at Local Events
- Send an Annual Contribution to AMSAT
- Join the President's Club
- Volunteer Your Time and Talent
- Spread the news on AMSAT
  - » Read the AMSAT News Service (ANS)
  - » Read the AMSAT Journal
  - » Use the AMSAT Website (www.amsat.org)
  - » Talk up AMSAT